WHAT IS CLAIMED IS:

1. A membrane artificial lung for performing gas exchange between blood and a gas via the membrane by flowing the blood in one side of the membrane and flowing oxygen or an oxygen-containing gas in the other side of the membrane,

wherein said membrane comprises a hollow fiber membrane, said hollow fiber membrane comprising poly-4-methylpentene-1 and having an oxygen permeation rate $Q(O_2)$ at 25°C of from 1×10^{-6} to 3×10^{-3} $(cm^3(STP)/cm^2 \cdot sec \cdot cmHg)$ and an ethanol flux of from 0.1 to 100 $ml/min \cdot m^2$,

wherein said membrane has, in the side of the blood flow, a surface comprising an ionic complex derived from:

quaternary aliphatic alkylammonium salts; and

heparin or a heparin derivative, and

wherein said quaternary alkylammonium salts comprise a quaternary aliphatic alkylammonium salt having from 22 to 26 carbon atoms in total and a quaternary aliphatic alkylammonium salt having from 37 to 40 carbon atoms in total.

2. The membrane artificial lung according to claim 1, wherein said quaternary alkylammonium salt comprises from 5 to 35% by weight of a quaternary aliphatic

alkylammonium salt having from 22 to 26 carbon atoms in total and from 65 to 95% by weight of a quaternary aliphatic alkylammonium salt having from 37 to 40 carbon atoms in total.

3. The membrane artificial lung according to claim 1, wherein said quaternary aliphatic alkylammonium salt comprise a dimethyldidodecylammonium salt and a dimethyldioctadecylammonium salt.

ABSTRACT OF THE DISCLOSURE

A membrane artificial lung for performing gas exchange between blood and a gas via the membrane by flowing the blood in one side of the membrane and flowing oxygen or an oxygen-containing gas in the other side of the membrane, wherein said membrane comprises a hollow fiber membrane, said hollow fiber membrane comprising poly-4-methylpentene-1 and having an oxygen permeation rate $Q(O_2)$ at 25°C of from 1×10^{-6} to 3×10^{-3} ($cm^3(STP)/cm^2 \cdot sec \cdot cmHg$) and an ethanol flux of from 0.1 to 100 $ml/min \cdot m^2$, wherein said membrane has, in the side of the blood flow, a surface comprising an ionic complex derived from: quaternary aliphatic alkylammonium salts; and heparin or a heparin derivative, and wherein said quaternary alkylammonium salts comprise a quaternary aliphatic alkylammonium salt having from 22 to 26 carbon atoms in total and a quaternary aliphatic alkylammonium salt having from 37 to 40 carbon atoms in total.